

REMARKS

Claims 1-3 and 6-16 are pending. Claims 2-3 and 11-15 have been withdrawn from consideration by the Examiner for being directed to non-elected subject matter. Thus, Claims 1, 6-10, and 16 are subject to examination. Claim 1 has been amended merely to correct a typographical error. As such, Applicants respectfully submit that no new matter is presented herein.

Objections

Claim 1 is objected to because of a minor informality. Applicants have amended Claim 1 as suggested by the Office Action. Accordingly, the Applicants respectfully request withdrawal of the objection to Claim 1.

Claim Rejection -- 35 U.S.C. §103

Claims 1, 6-8 and 10 are rejected under 35 U.S.C. §103(a) as being unpatentable over Ikeda (US Patent No. 5,462,899) in view of Long (U.S. Patent Publication No. 2003/0084848); and Claim 9 is rejected under 35 U.S.C. §103(a) as being unpatentable over Ikeda in view of Long and further in view of Hayashi (U.S. Patent Publication No. 2001/0012698).

Claim 1 recites a method for preparing an oxide thin film on a substrate, comprising, among other features, admixing a raw gas obtained through the vaporization of a raw material comprising metal atoms for the oxide thin film, a carrier gas and an oxidation gas in a gas-mixing unit, passing the gas mixture through a gas

activating means which is arranged between the gas-mixing unit and a shower plate and which has a pipe line with an ***inner wall surface area within a range of $4.8 \times 10^{-3} \text{ m}^2$ to $1.28 \times 10^{-1} \text{ m}^2$*** , maintaining the gas activating means being maintained at a temperature that induces vapor phase decomposition, decomposing the gas mixture, and supplying the gas mixture on a heated substrate placed in a reaction chamber. Applicants respectfully submit that Ikeda and Long, alone or in combination, do not teach, suggest, or render obvious all of the features recited by Claim 1.

The Office Action cites admits that Ikeda does not teach a pipe line with an inner wall surface area within a range of $4.8 \times 10^{-3} \text{ m}^2$ to $1.28 \times 10^{-1} \text{ m}^2$. In order to cure the admitted the Office Action cites Long for allegedly teaching the feature. In particular, the Office Action cites paragraph [0060] for teaching a surface area of 0.25 m^2 . However, Applicants respectfully submit that 0.25 m^2 does not fall within the range recited by Claim 1. The range recited by Claim 1, in m^2 units is 0.0048 to 0.128m^2 . Thus, the highest value recited by Claim 1 is nearly half the value taught by Long. As 0.25 m^2 is entirely outside the recited range of $4.8 \times 10^{-3} \text{ m}^2$ to $1.28 \times 10^{-1} \text{ m}^2$, Applicants respectfully submit that Long does not the recited surface area. Accordingly, Long does not cure the admitted deficiency of Ikeda.

Furthermore, as discussed in the Response dated December 30, 2010, by keeping the inner wall surface area of the pipe line within the recited range, unexpected advantages and benefits are obtained. For example, activation of the raw gas and the realization of excellent epitaxial growth; and optimization of the decomposition of the raw material to be introduced into the reaction chamber to obtain the desired metal

atom-containing molecules, which results in the oxide film being formed efficiently and with improved film properties. See paragraph [0037] of the instant application.

Moreover, as explained in paragraph [0047] and illustrated in Figure 3 of the instant application, the recited inner wall surface area beneficially affects the leak current density of the PZT thin film. See paragraph [0048] and Figure 4, which explain how the recited inner wall surface area beneficially affects the polarization-inversion charge density; and see paragraph [0049] and Figure 5 which explain the recited inner wall surface area beneficially affects the polarization-saturation voltage.

Hayashi is cited merely for teaching a substrate made from one of the materials recited by Claim 9. Thus, Hayashi does not cure or otherwise address the above-described deficiency of Ikeda.

Applicants respectfully submit Ikeda, Long, and Hayashi, alone or in combination, do not teach or suggest the invention recited by Claim 1. Therefore, Applicants respectfully submit Claim 1 is not rendered obvious by Ikeda or the combined teachings of Ikeda, Long, and Hayashi, and should be deemed allowable.

Claims 6-10 and 16 depend from Claim 1. It is respectfully submitted that these dependent claims be deemed allowable for at least the same reasons Claim 1 is allowable, as well as for the additional subject matter recited therein.

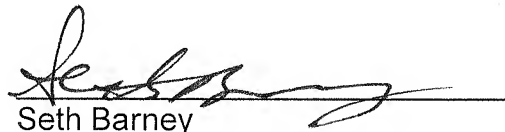
Withdrawal of the rejections is respectfully requested.

Conclusion

Applicants respectfully submit that this application is in condition for allowance and such action is earnestly solicited. If the Examiner believes that anything further is desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact Applicants' undersigned representative at the telephone number listed below to schedule a personal or telephone interview to discuss any remaining issues.

In the event this paper is not considered to be timely filed, the Applicants respectfully petition for an appropriate extension of time. Any fees for such an extension, together with any additional fees that may be due with respect to this paper, may be charged to counsel's Deposit Account No. 01-2300, **referencing attorney docket number 026390-00034.**

Respectfully submitted,


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